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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WALBERG, TERESA J

ART UNIT PAPER NUMBER

3753

DATE MAILED: 04/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,298

Applicant(s)

WALCZAK, WALTER S.

Examiner

Teresa J. Walberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) 21-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-19 is/are rejected.
- 7) ☒ Claim(s) 3 and 20 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/23/04</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. The numbering of claims is not in accordance with 37 CFR 1.126 which requires the original numbering of the claims to be preserved throughout the prosecution and that claims be numbered consecutively. When new claims are presented, they must be numbered consecutively beginning with the number next following the highest numbered claims previously presented (whether entered or not).

The second paragraph of claim 19, at the top of page 13, appears to be a separate un-numbered claim. This claim has been numbered 20. Since this claim depends from claim 14, it has been included with the elected claims.

Original claims 20-28 have been renumbered as 21-29.

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-19, renumbered as 1-20, drawn to an apparatus comprising an annular cold plate and a method of using the apparatus for heat removal, classified in class 165, subclass 80.4.
- II. Claims 20-28, renumbered as 21-29, drawn to a system for facilitating inspection of a die mounted to the die plate, classified in class 324, subclass 760.

3. The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP §

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806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination is directed to a system for facilitating inspection of a die mounted to the die plate which does not require a first coolant fluid flowing in a direction selected from one of a clockwise and a counter-clockwise direction and a second coolant fluid flowing in an opposite complementary direction as recited in Group I. The subcombination has separate utility such as an annular cold plate used for electronic cooling as shown by U. S. patent No. 6719039 or for dual refrigeration system as shown by U. S. Patent No. 5896922.

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

5. During a telephone conversation by examiner Emily Chan with attorney Yeung on 5 January 2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-19, now renumbered as claims 1-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-28, now renumbered as 21-29 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 7, 9, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Litton (2,362,911).

Litton discloses (see Fig. 9) a liquid cooling apparatus having the claimed structure including an annular cold plate (92), a first reflexive circumfluent channel (95) within the annular cold plate, traversing from a first inlet along a first direction to a first outlet to remove heat from a heat source (90) at a center of the annular plate, and a second reflexive, circumfluent channel disposed within the annular cold plate traversing from a second inlet along a second direction to a second outlet. Note that the term "cold plate" is interpreted to mean a surface used for cooling, and is not being interpreted to require any specific shape or proportions, thus the term "plate" is not interpreted to require a flat surface.

With respect to claim 7, the cold plate (92), the first channel (coil 95), and the second channel (coil 96) are co-planar and have substantially the same height (see Fig. 9).

With respect to claim 9, the cold plate (92) can be considered to occupy a vertical plane and the channels can be considered to occupy a plane orthogonal to the vertical plane since they follow a flow path that circles the vertical axis.

With respect to claim 14, Litton teaches providing a coolant fluid to an annular cold plate (92) having first and second reflexive circumfluent channels (95 and 96 in Fig. 9) to remove heat from a heat source (90) substantially disposed at a center of the annular cold plate (see Fig. 9) and flowing a first and a second portion of the coolant fluid through the first and second channels

respectively (the portion being 100%). It is noted that this claim does not require that the fluid be divided between the channels, such they are in a parallel flow rather than a series flow relationship, or that less than all of the fluid flows through each channel.

8. Claims 1, 2, 7, 10, 14, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Tappan et al (5,200,232).

Tappan et al disclose (see Figs. 8-10) a liquid cooling apparatus having the claimed structure including an annular cold plate (7), a first reflexive circumfluent channel (inner channel of 39) within the annular cold plate, traversing from a first inlet (36) along a first direction to a first outlet (at the flow reversal point) to remove heat from a heat source (44) at a center of the annular plate, and a second reflexive, circumfluent channel (outer channel of 39) disposed within the annular cold plate traversing from a second inlet (at the flow reversal point) along a second direction to a second outlet (37). Note that the terms "inlet" and "outlet" are considered the mean the beginning and end of that particular channel and are not considered to require that the fluid leave or enter the plate at that point.

With respect to claim 7, the cold plate, the first channel, and the second channel, are co-planar and have substantially the same height (see Fig. 10).

With respect to claim 14, Tappan et al teaches providing a coolant fluid to an annular cold plate (7) having first and second reflexive circumfluent channels (the inner and outer channels 39 in Fig. 9) to remove heat from a heat

source (at 44) substantially disposed at a center of the annular cold plate (see Fig. 9) and flowing a first and a second portion of the coolant fluid through the first and second channels respectively (the portion being 100%). It is noted that this claim does not require that the fluid be divided between the channels, such they are in a parallel flow rather than a series flow relationship, or that less than all of the fluid flows through each channel.

With respect to claim 16, the flows through the channels have opposite directions. See Fig. 9.

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 4-6, 13, 15, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litton (2,362,911) in view of Goth et al (6,053,238).

Litton discloses the claimed structure and method with the exception of the first and second channels crossing each other, an outlet being insulated, and the inlet and outlet having flows that split and combine, respectively.

Goth et al teach the use of coolant flow paths that crossing each other (see Fig. 10), an insulated outlet (col. 12, lines 27-31), and the inlet and outlet having flows that split and combine, respectively (see Fig. 10).

It would have been obvious in view of Goth et al to use coolant flow paths that crossing each other, an insulated outlet, and the inlet and outlet having flows that split and combine in the cooling system of Litton, the motivation being of enable greater control of the flow path and to even out temperature differences across the cold plate.

11. Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Litton (2,362,911).

Litton discloses the claimed structure with the exception of the height of the elements being 0.5 inches and the relative directions of the first and second flow paths being opposite. However, the annular plate and coils of Litton could be made in any desired height based on the size of the object intended to be cooled. It would have been obvious to give the elements of Litton a height of 0.5 inches based on the intended use of the device. The flow path is the outer coil of Litton is shown in Fig. 9 as being clockwise, but it is unclear whether the inner coil flow path is clockwise or counter-clockwise. It would have been obvious to make the direction of flow of the inner coil opposite that of the outer coil for ease of manufacture since it does not appear that the direction of flow of the inner coil would make any difference in the functioning of device of Litton and thus it would appear to be a matter of design choice.

12. Claims 11, 12, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tappan et al (5,200,232) in view of Schmidt et al (6,058,010).

Tappan et al disclose the claimed structure and method with the exception of the first and second channels containing a thermally conductive surface enhancing material including pins or fins.

Schmidt et al teach the use of a thermally conductive surface-enhancing material including pins or fins in coolant flow paths (see Figs. 4B and 4C).

It would have been obvious in view of Schmidt et al to use thermally conductive surface enhancing material including pins or fins in coolant flow paths in the cooling system of Litton, the motivation being to increase the rate of heat transfer.

13. Claims 3 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

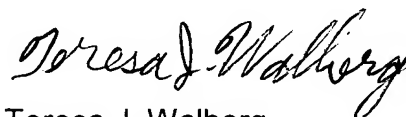
14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Riley, Friedman, Cathey et al, Chen et al, Sahin et al, Vafai et al, and Yamada are cited to show cold plate structure.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Teresa J. Walberg whose telephone number is 571-272-4790. The examiner can normally be reached on M-F 9:00 - 5:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene Mancene can be reached on 571-272-4930. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Teresa J. Walberg
Primary Examiner
Art Unit 3753

tjw